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# THE NECESSITY FOR NEW STANDARDS OF HOP VALUATION.

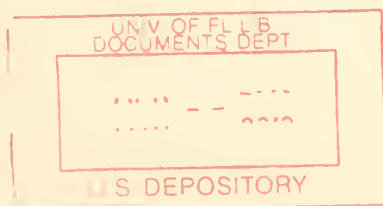
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# THE NECESSITY FOR NEW STANDARDS OF HOP VALUATION.<sup>a</sup>

## INTRODUCTION.

Notwithstanding the fact that the desirability of a definite standard for judging the quality of hops has long been recognized, certain practical considerations have thus far prevented its realization. Not the least among these has been the existence of a wide difference of opinion as to what constitutes quality and as to the nature and desirable amount of the various constituents of a strictly high-grade hop. Partly because of the prevailing uncertainty as regards the basis of quality and in part because of the advantage which a long-established product in one location usually has over the same product from a new region, many consumers practically lay aside all other considerations and buy on the basis of geographical origin.

A careful examination of representative crops of hops in the various hop-growing regions can but lead to the conclusion that a judgment as to quality based on origin alone must in many cases result in a disadvantage to the consumer and in many others operate to the disadvantage of the producer. The difference in the quality of hops produced on farms situated only a few miles apart may be far greater than that between certain selected grades from two or more regions widely separated. There is strong ground for the opinion that this

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<sup>a</sup>In connection with investigations on American hop growing and handling, it has become apparent that there is a great lack of uniformity in methods used by American hop buyers in reaching a basis of valuation of the product. Some buyers adopt geographical origin as the important criterion; others the aromatic qualities; others the appearance chiefly; while still others accept various combinations of these qualities. Hence for this important agricultural product there is no generally recognized basis for determining real merit. This is due to a variety of conditions which can not be discussed here. The desirability of reaching some common ground of action is recognized by many not only in America, but also in Europe. The accompanying paper written by Dr. W. W. Stockberger, Pharmacognosist, under the direction of Dr. Rodney H. True, Physiologist in Charge of Drug-Plant Investigations, is presented in the hope that it may aid in bringing order into this phase of the hop situation. B. T. GALLOWAY, *Chief of Bureau*.

fact is well known to the hop trade, since the reported sales of hops from certain districts bearing a favorable reputation may be several times greater than the production therein. Hops which would be rated of poor quality if their origin were known may obtain very favorable consideration when represented as coming from a locality which has a reputation for hops of fine quality.

Through long experience a considerable degree of skill may be acquired in the discernment of the probable origin of a sample of hops. Some even claim the ability to tell from an inspection of the sample the exact section or river valley in which the hops were produced. This they may succeed in doing at times in the case of the poorer grades or when there is present a secondary factor due to some peculiarity in the method of curing or in the manner of preparation, but they can not generally succeed, as such judgment, based merely on the marks of superficial resemblance, can at the most be only guesswork. The extravagance of these claims was amply demonstrated in a case that came under the personal observation of the writer. A man who has had a wide experience in the hop industry extending over many years made up in a uniform manner a series of samples of hops from the principal hop-growing sections of the United States. The samples were all of fair quality and in their selection marked physical deficiencies were purposely avoided. These samples were then marked with a cipher and submitted in turn to a number of expert judges of hops. Not one was able to identify the samples correctly. Moreover, the man who prepared these samples could not place them correctly without the cipher. This and other similar experiences indicate clearly that too much emphasis is laid on geographical origin as a criterion of quality in hops.

#### PRESENT METHODS OF VALUATION.

Almost without exception the producer sells hops on the basis of an empirical physical examination, but the consumer who purchases his supply from a dealer or broker may subject his samples to chemical as well as to physical examination. The points which are considered in estimating quality are numerous and vary considerably according to individual ideas. The more important of these are: Aroma or flavor, color, amount of lupulin, "richness" or "fatness," curing, picking condition, freedom from leaves and stems, etc., freedom from mold and insects, amount of broken hops, quantity of seeds present, maturity, softness of texture, silkiness, stickiness or oiliness, flakiness, size of the cones, degree of sulphuring, and "feel."

Certain features, as, for example, the presence of leaves and stems, mold, insects, lack of lupulin, broken hops, and musty or sour smell, are generally considered as detrimental to quality and are usually to

be readily determined by inspection. The relation which such characteristics as aroma, color, size of cones, etc., bear to quality depends entirely on individual preference and is not determined by any particular standard. The judgment is formed from the impressions made by the hop upon the senses of sight, smell, and touch, and hence gives no quantitative measure of the characteristics of the hop.

In Germany a nearer approach has been made to a uniform method by the adoption of schedules or score cards which attach relative values to certain characteristics. The following is the schedule by which hops were rated at the sixth exhibition of the brewing barley and hops of Baden, held at Augustenberg in October, 1907:

| Development of the cones.              | Quality and quantity of lupulin. | Aroma. | Color. | Picking. | Drying. | Sorting. | Total number of points. <sup>a</sup> |
|----------------------------------------|----------------------------------|--------|--------|----------|---------|----------|--------------------------------------|
| Number of points considered in rating. |                                  |        |        |          |         |          |                                      |
| 5.                                     | 5.                               | 5.     | 3.     | 3.       | 3.      | 3.       |                                      |
|                                        |                                  |        |        |          |         |          |                                      |

<sup>a</sup> Total points possible, 27.

Many other similar schemes have been proposed, but in the end they all depend upon individual taste or preference.

Far less importance is apparently attached to chemical analysis as a means of determining quality. When this method is employed it is customary to determine only such constituents as are regarded of greatest importance. Some consider the hard and soft resins of greatest importance in the measure of quality and hold that in a good sample the soft resins should be not less than three times greater in quantity than the hard resins; some place more weight upon the tannin content; others regard the proportions in which such mineral constituents as potassum, lime, and magnesium occur in the ash as an index to the quality of the hop. It thus appears that the chemical estimate of quality is in as great a state of uncertainty as the physical examination, owing to the lack of agreement as to the relative importance of the constituents determined by this method.

#### DEFICIENCIES OF EXISTING METHODS.

The greatest defect in the method of physical examination lies in the fact that it is incapable of exact application. The relative value attached to the various points taken into consideration will differ materially with various individuals. Although so much importance is attached to the aroma that with many persons it is the ultimate

test of quality, yet it can give no very accurate information as to intrinsic value.

It has been definitely proved that in many cases certain subconscious factors influence the estimation of aroma and the other constituents of the hop. The chief of these is geographical origin, to which reference has been made. Another is the presence or absence of some familiar physical character which may bear no relation to intrinsic value, but nevertheless affects the judgment. This conclusion was forced upon the writer by the following experiment made several years ago when in the hop fields of California. In this experiment a large basket was filled with hops from the drying floor of a kiln newly filled with fresh hops from the field before either heat or sulphur had been applied. These hops were spread out on the floor of a room, where, protected from the sun, they were allowed to dry. After the hops on the kiln floor had been dried in the usual manner by the application of heat and sulphur fumes the basket was again filled from the kiln floor, this time with dried hops selected from the same part of the kiln that had furnished the first sample. These two samples were, therefore, practically identical in every respect except in the method of drying. The quantity of resins was determined in a portion of each sample and the hops which had been dried on the kiln were found to contain less soft resin than those which had dried naturally on the floor of the room. Small hand samples of each lot were also prepared and submitted to four expert judges of hops who were ignorant of their origin and method of preparation. Two of these judges pronounced the kiln-dried sample superior to the one dried on the floor; two considered the floor-dried sample superior to the one dried on the kiln.

The experience just related affords a splendid illustration of the workings of the present method of valuation and of the great part played by preconceived ideas of merit. It is also of much interest to study the opinions held with regard to German or Bohemian hops, which have long enjoyed the reputation of great superiority over those produced in the United States because of the specially fine aroma ascribed to them. It is apparent, however, that the relationship of the aroma to the other constituents has never been fully determined, but differences in aroma have been assumed to be qualitative and indicative of wide differences in composition. There is evidence for believing that differences in aroma are largely quantitative and that this factor is not necessarily a criterion of quality in the hop. The chaotic condition of existing ideas with respect to hop aroma and quality and the necessity for their thorough revision is further illustrated by the following opinions, each from a different specialist in the use or judgment of hops.

Saaz hops are best.

The idea of the superiority of the foreign hop is largely a matter of prejudice. German hops are unquestionably best.

Kent hops are the finest; they are better than the German.

The Wisconsin hops are as good as the German.

German hops are best because of their fine aroma. A pound of German hops is worth 3 pounds of American.

The best New York hops are practically as good as the German.

A shrewd dealer can sell anything that looks like a hop.

Since hops of different geographical origin have different flavors, naturally individual preferences become established.

The present method of judging hops is a very doubtful one; prejudice or taste plays the larger part.

Pacific coast hops are stronger in preservative resin than English hops.

American hops can never equal the German, but they can be greatly improved.

So far as general quality is concerned, if New York hops were as carefully picked and handled as the foreign hops they would equal the German in quality.

Differences between American, English, and German hops are almost entirely a question of flavor.

German hops have much more lupulin than the American.

There is a wide difference in the quality of German hops. New York hops grown from German roots are better than the poorer grades of German hops.

Quality really does not amount to much. Salesmanship rather than quality counts. Hops are frequently bought as one kind and sold as another.

Pacific coast hops contain more lupulin than foreign hops.

English hops are superior to the German hops. The superior flavor ascribed to the German hop is chiefly a question of preference.

German hops have a superior flavor but are not so superior to the American hops as has been generally supposed.

The best Pacific coast hops are as good as the German or Bohemian hops.

The uncertainty of the results of physical examination and the difficulty of determining quality in hops by inspection has been long recognized in Germany, where many safeguards have been adopted to secure authenticity in the representation of the origin of their hops. That the hop trade recognizes and plays upon these prejudices is shown by the following statements of Emanuel Gross:<sup>a</sup>

It is justly alleged against certain dealers that they falsify the origin of their hops. \* \* \* A prominent part is now played by the numerous associations for securing a proper guaranty of the origin of hop parcels. Certain unscrupulous dealers have made fortunes by falsifications of this nature, viz. buying small quantities of, say, fine Saaz hops, mixing them with larger amounts of hops from other districts \* \* \* and selling the whole as Saaz hops.

The regulations existing in Germany and Austria under which packages of hops are sealed and accompanied by a certificate in order that their origin may be guaranteed in the interests of both growers and consumers, and the requirement in England that hops must be branded with the name and address of the grower, appear to indicate a widespread inability on the part of consumers to judge the quality of hops.

<sup>a</sup> Gross, E. Hops, pp. 315, 320, 1900.

## NECESSITY FOR NEW STANDARDS.

Any rational plan for the improvement of a crop requires a definite standard of quality or value by which deficiencies can be measured and from which clear ideas respecting the lines along which improvement is desirable can be readily obtained. The lack of high standards has too often led to specialization on the feature of yield alone, and the consequent neglect of other factors has tended to reduce rather than to improve the quality. Instead of choosing varieties which produce hops of fine quality, growers have selected those which give the highest yield, believing that the lower price received for the poorer quality was more than compensated by the increased yield received over the better varieties. There is no doubt that the unreliable and inefficient methods of judging quality largely in vogue to-day furnish at least a partial justification for this assumption.

The disastrous prices which have prevailed for several years and the apparent gradual decline in the world's consumption of hops should clearly impress upon hop growers the desirability of better methods of culture and necessity for high and definite standards of quality. When, as is the case at present, the world's production exceeds its consumption, consumers will be hard to please and they can demand and secure the better grades of hops. For the poorer grades no market can be found that will return a profit to the producer.

For a number of years the American hop crop exceeded home demands, and under these conditions the usual practice has been to seek an outlet for the American surplus abroad. In the foreign markets American hops have come into competition with the hops produced in other countries and are judged by the standards of quality which prevail there. The success, therefore, which American hops attain abroad will be conditioned by the degree to which they meet the foreign standards of requirement. Whether these standards are right or wrong, the fact remains that they are firmly established and therefore warrant the careful consideration of the American grower.

Owing to increased production in Germany and Austria there have been heavy exports from these countries to the United States during the past four years. The resulting competition has been unfavorable to American hops because of the reputation for better quality which the imported hops enjoy. To many persons the characteristics of the imported hop form a standard with which all other hops are compared. This is an arbitrary assumption, which fails to consider that there are wide differences in the quality of imported hops, and which determines quality largely on the basis of geographical origin, without reference to intrinsic merit. When the various local and seasonal factors which influence quality are taken into account, it will be seen that present methods are inadequate for the determination of the variation in the hop constituents.

It seems, however, that a careful and unbiased comparative study of the nature and quantitative relations of the constituents of American and European hops has never been made with the view of securing a definite basis for a standard of valuation. A great deal of work has been done on the constituents of hops, but so far no basis of agreement has been reached in the interpretation of the relation of these constituents to quality except in a very general way.

The hops produced in certain regions have established a high reputation and the belief is not infrequently expressed that hops of fine quality can not be grown elsewhere. This is a very broad assertion and is contrary to the results secured with many other cultivated plants. A fact not usually considered is that hops from the same geographical region may differ greatly in aroma. This difference is due to a number of factors, prominent among which are, first, the variety cultivated. Certain varieties possess a well-defined and characteristic aroma, and the possibilities of variation in this characteristic through the crossing of varieties appear to be very great. Second, the aroma is influenced by the time of picking. The volatile oil to which the aroma is largely due increases in quantity as the hop approaches maturity, and as a result fully ripe hops have a stronger aroma than those picked in an immature condition. Third, the process of drying and the "casing" in the cooling room are both capable of inducing modifications in the aroma. These considerations should lessen the dependence placed on origin as a means of determining quality.

Such wide differences in notions of quality as those previously cited could not exist if there were a definite standard by which quality was measured. Not only do the judgments of those who depend upon physical tests alone differ widely, but there is a wide divergence in opinion based on chemical tests as well. Moreover, it is well known that the opinions of those who depend entirely upon physical examination do not often agree with the opinions of those who form their judgments as a result of chemical analysis.

It is essential that there be established uniform methods of making physical and chemical examinations of hops just as there have been established and accepted uniform methods of examining and testing many other materials. Standards of quality must be established also, for a fair comparative valuation can be secured only on the basis of well-defined and universally adopted tests. New standards founded upon an exact knowledge of the nature and relative worth of the various hop constituents are necessary to prevent unmerited discriminations being made in the markets which work a hardship to many American hop growers and which impose unnecessary costs upon the consumer.

**MOVEMENT FOR AN INTERNATIONAL STANDARD.**

The great inconvenience to the hop trade arising from the lack of a reliable crop-reporting service and from the difficulty of obtaining authentic statistics on the acreage and annual production is appreciated as fully in Europe as in America. As a result of these conditions a movement was set on foot recently in Germany having for its object the formation of an international agreement between the hop-raising States of various countries, under the terms of which a reliable reporting and statistical service might be secured. Pursuant to this end, at the International Hops and Barley Exhibition held at Berlin in October, 1908, a conference was called of all the representatives of hop growers in attendance for the purpose of general discussion, and to consider the establishment of an international bureau of information regarding the production, consumption, and value of hops, and to formulate plans of united action for the mutual benefit of those engaged in the hop industry.

A committee was appointed to work out the details of the plans suggested at this conference and to send them to the hop growers' organizations in the various countries. It was also resolved to call a general conference of representatives of the growers of all the hop-producing countries to meet in Bohemia in the latter part of August, 1909. It was further decided that at this conference the establishment of an international standard for judging the quality of hops should also be carefully considered.

Sufficient reasons have been advanced to show that the adoption of a new and impartial standard of quality is not only desirable but necessary. When it is considered that the favorable reception of American hops abroad depends upon foreign approval; that the adoption of an international standard based entirely upon European ideas of quality without regard to the intrinsic merits of American hops would operate to the disadvantage of the American grower; and that American hops are measured as to quality in their home markets by a standard of excellence based upon the features of hops imported from the German Empire, it seems that the hop growers of the United States should not fail to avail themselves of the opportunity to send to this conference duly authorized and qualified representatives, who should aim to secure more favorable consideration of the qualities of American hops. Every effort should be made to bring about the thorough revision of the methods of hop valuation and to secure the reinvestigation of hop constituents as a step preliminary to the fixing of an international standard, which should be based on intrinsic value without reference to other factors.

The objection may be urged that the American representatives would be so outnumbered in a conference to be held abroad that their

views would not receive full consideration, and that it were better, therefore, to take no part in the movement. On the other hand, no international standard could be adopted except with the accord of all the representatives, and a strong presentation of the necessity for a broader and more thorough basis of hop valuation could not be ignored. Such action should lead to the clarification of ideas respecting the quality of hops.

Approved:

JAMES WILSON,

*Secretary of Agriculture.*

WASHINGTON, D. C., *May 13, 1909.*

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